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EDITORIAL.

Internal Economy in the Palm Oil Factory.

The maximum recovery of high quality palm oil and palm kernels is the chief objective of the palm oil factory. It is only when the factory has been in operation for some time that the necessity for economy of fuel becomes apparent. By this time the supply of residual jungle-timber in the vicinity of the factory will have become exhausted and supplies will become more expensive as they are collected at increasing distances from the factory.

With efficient management, the bulk of the fuel for the factory is supplied by the nut-shells and the pericarp residue, the former being the more important constituent. The authors of an article in this number discuss this subject under the title "Fuel Economy in the Palm Oil Factory". They shew that although these waste materials are not efficient fuels, under certain conditions they can be made the main source of supply.

To obtain the maximum value of the fuel the material should be adequately dried. Further economies are possible in the hands of an efficient furnace attendant. Attention is also drawn to the fact that additional economies are possible by the utilization of exhaust steam and by adequate heat insulation.

In view of the narrow margin now existing between cost of production and selling price of the oil and kernels, increased attention to possible economies in production are of great importance. The article mentioned above discusses this question and supplies data concerning boiler efficiency and the calorific value of the fuels usually employed in palm oil factories.

Mushroom Culture.

The cultivation of mushrooms has been discussed in various numbers of this Journal. Descriptions have been given of the cultural methods employed successfully in Province Wellesley and Penang. Subsequent attempts to repeat these methods in various parts of the country have been unsuccessful. It is evident, from

the short article on another page, which records the development of these mushrooms in Kedah without cultivation, that, given the proper conditions, this variety of mushroom is suitable for cultivation in Malaya. It is equally evident that the ideal conditions are as yet imperfectly understood.

The Department of Agriculture is making a close study of this problem, and it is hoped that the results of these investigations will place growers in possession of more exact knowledge of the climatic and other requirements for the cultivation of this edible fungus.

Original Articles.

FUEL ECONOMY IN THE PALM OIL FACTORY

BY

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Introductory.

Although the principal aim of the palm oil factory manager is the maximum recovery of high quality palm oil and palm kernels, the economical raising of the necessary steam supply for the factory should not be neglected.

In the early stages of working the factory, the question of fuel consumption is apt to be overlooked, principally on account of absence of any direct return as a result of effecting economies in this direction. Fuel is plentiful, since in addition to nut-shells and pericarp residue, invariably there is residual jungle timber in the vicinity of the factory.

As time passes and timber must be collected at increasing distances from the factory, the question of making the estate factory more nearly self-supporting as regards supplies of fuel becomes of much greater importance.

Although it is not suggested that this state of affairs is yet typical of palm oil factory practice in Malaya, it serves to emphasize the importance of the conservation of fuel and steam supplies in the factory, while drawing attention to the combined objective of the factory manager—the maximum recovery of high quality products under the most economical conditions.

Attention has been given to this question in the palm oil factory at the Central Experiment Station, Serdang, and the present article summarises the results of experiments made to test the efficiency of steam-raising there. A description of the plant installed at Serdang has already been published.*

The economical supply of steam in a factory falls under three headings: fuel efficiency, boiler efficiency, and efficient use of the steam which has been generated.

Factories, in general, select the most economical and efficient fuel available, but when they have a waste product which is combustible it is usually burnt under boilers although itself of low efficiency or heat value. As palm oil factories burn mainly waste products, and in Malaya the supplementary fuel is inevitably wood, factory managers may be said to have no choice of fuel, and thus the question of fuel efficiency becomes rather academic. Nevertheless, it is necessary to estimate the efficiency of the fuel in use before a calculation of boiler efficiency can be made.

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* *Malayan Agricultural Journal,* Vol. XIX, No. 8, August 1931, page 384.

The efficiency in the use of steam could not be numerically estimated at Serdang as no adequate alternative motive power was available. It is only possible to indicate some of the precautions which make for conservation of steam. Steam lines should be as short as is consistent with a sufficiently spacious lay-out of the factory and should be well lagged to minimise loss of heat. Exhaust steam should be used to heat the boiler feed water, and closed steam coils should be provided with steam traps which do not allow steam to escape but only the condensed hot water which also joins the boiler feed.

Actually, at Serdang the distribution and utilisation of steam is not very good. In particular, the steam engine is too far from the boiler and the steam pipe is too narrow so that the pressure of steam delivered to the engine falls short of that registered at the boiler. The reason for the apparent bad placing of the engine is that it is also required to supply power to an adjacent factory.

The steam engine at Serdang is designed to work at high pressure. The boiler pressure of 140 lbs. is not really high enough for its efficient working, although this is far greater than is required for other purposes in the factory. Estate factories commonly employ boilers raising steam at 60 to 80 lbs., with engines working at correspondingly low pressure. It should be mentioned that, theoretically, from thermodynamic principles, the possible efficiency of an engine increases as the range of temperature between inlet and exhaust increases, and that high efficiency in steam-power production demands high boiler pressures. Nevertheless, where a large amount of low pressure steam is required, as in a palm oil factory, a low pressure engine is a suitable equipment.

Nature of Fuel Available.

Although any of the solid waste products from the factory may be used as fuel, the two most important are the nut-shells and the pericarp residue. The possibilities of using the residual fruit bunches from the threshing-machine should not, however, be disregarded.

The nut-shells constitute a more important fuel supply than the pericarp residue, the output of shells being much greater, while in addition they are easily handled and do not burn away so readily as the light fibrous pericarp residue. Calculations show that, for fruit containing 10 per cent. by weight of bunch trash, the proportions of waste products on an air-dry basis are approximately 27 per cent. by weight of nut shells to 15 per cent. by weight of pericarp residue; that is, the amount of nut-shells is nearly double that of the pericarp residue.

Preliminary chopping of the bunch residue into two or more pieces, followed by air-drying is essential to facilitate handling and to reduce the moisture content, which may amount to as much as 65 per cent. by weight of the fresh material.

An essential factor in the calculation of the efficiency of the boiler is the determination of the heating or calorific values of the materials used as fuel.

The calorific value of a fuel may be defined as the number of heat units liberated by the complete combustion of unit weight of the material. In this case weights will be expressed in pounds, and the calorific values as British Thermal Units (B.T.U.)†.

The following table, Table I, shows the gross calorific values as determined in a calorimeter, of various oil palm products, including palm oil, palm kernels and palm kernel oil. The last three products are included merely for reference purposes.

Timber has also been included in the table, as most oil palm estates find it necessary to use timber to supplement the fuel supply of the factory.

Table I.

Gross Calorific Values of Oil Palm Products and Timber.

(Values are given to the nearest 10 units)

Product	Moisture Content	Calorific Value.	Estimated Calorific Value (Moisture-free basis)
	per cent.	B.T. Units	B.T. Units
Bunch residue ...	15.6	6,910	8,190
Residue from stripped fruit ...	12.1	7,010	7,980
Pericarp residue (Oil content 17 per cent. moisture-free basis) ...	13.4	8,190	9,460
Nut-shells ...	12.1	7,950	9,040
Palm oil ...		17,580	17,580
Palm kernels ...	8.2	11,330	12,340
Palm kernel oil ...		16,720	16,720
Timber ...	10.0	7,540	8,380

The gross calorific values as given in Table I are greater than can be obtained on burning the fuels in a furnace because the moisture present has to be converted into steam, and the hydrogen content is burnt to water which also escapes as steam. The conversion of one pound of water into steam consumes approximately 1100 B.T.U.* and it may be added that hydrogen produces 9 times its weight of water.

† One B.T.U. is the amount of heat required to raise by one degree Fahrenheit 1 lb. of pure water at or about 39°F. For practical purposes it can be regarded as 1/180th of the amount of heat required to raise the temperature of 1 lb. of water from freezing to boiling point.

* If allowance is also made for the heat consumed in superheating the steam from the boiling point of water, 212°F., to an assumed flue temperature of 700°F., the loss of heat occasioned by one pound of water in the fuel is increased from 1100 to 1334 B.T.U. It is not intended in this article, however, to differentiate the superheated steam from any of the other flue gases.

The high calorific value of the air-dry pericarp residue is due to the presence of palm oil, which has a value of 17,580 B.T.U. compared with approximately 7,000 B.T.U. for the oil-free material on a similar basis.

Relationship between Moisture Content and Calorific Value.

Every effort should be made to reduce the moisture content of any waste product used as fuel to avoid loss of the heat wasted in evaporating excess moisture. This applies particularly to the pericarp residue from the depericarping screen and to a lesser extent, to the fragments of shell, if the wet method of separation has been employed. Fragments of shell from the Wilder dry separator may, however, be used direct.

Both nut-shells and pericarp residue should, therefore, be spread in thin layers on the floor of the factory to dry before being fed to the furnace. Further, timber should be cut and stacked, if possible, some weeks in advance to allow it to dry.

The use of material with a high moisture content is obviously uneconomical for two reasons, namely, the extra weight of material involved and the consumption of heat necessary for vapourising the moisture.

The calorific value of moist fuel (B.T.U. per lb.) is much less than of dry fuel; for example, air-dry pericarp residue may have twice the calorific value of the moist material; but naturally the latter is correspondingly heavier, and therefore for a given batch of such a waste product, failure to dry it before firing simply involves the loss of heat required to vapourise the water it contains (1100 B.T.U. per lb.), always assuming that the waste product is never so moist as to "damp" the fire or create excessive smoke.

Reduction of moisture content to about 10 per cent. is the best that can be achieved by air-drying in Malaya and it is realised this is not attainable for all materials under average factory conditions. In power units burning coal, the fuel is frequently watered before firing, the loss of heat thereby occasioned being more than compensated by the greater evenness of combustion on the fire bed. Similarly, it is not advantageous to fire pericarp residue in too dry a state.

Firing of Boiler Furnace.

Experience shows that the economical use of fuel depends to a very considerable extent on the skill of the attendant, who should pay special attention both to the thickness of the layer of combustible material on the fire-bars and to the air supply to the grate. If the layer of fuel is too thick, and insufficient air is present, combustion will be incomplete and much smoke will be emitted from the chimney-stack; on the other hand, if the layer is too thin and an excess of air is admitted, the fire is apt to burn too fiercely, much heat being lost in the excessive draught produced.

Considerable economies are possible, therefore, in the fuel requirements of the factory if the attendant pays constant attention to the state of the fire and is also familiar with the adjustment of the damper.

Boilers vary in design and possible efficiency. Where a boiler is not sufficiently lagged or provided with adequate heat insulation, the direct loss of heat by radiation to the surroundings is evident. For burning wood and other bulky fuels a larger grate area and more capacious fire-box are necessary than in coal-burning boilers.

Feed-Water for Boiler.

A suitable water supply is necessary; for if impure water is used without any pre-treatment, a non-conducting scale may be deposited on the interior surface of the boiler, seriously reducing its efficiency.

The heat available in the exhaust steam supply should also be utilised by installing a feed-water heater for the boiler, thus saving fuel and increasing the output of the boiler. It is estimated that a rise of 10°F. in the temperature of the feed-water represents a saving in fuel of approximately 1 per cent. Since there is a difference of roughly 120°F. between the normal temperature of feed-water and the boiling-point of water it will be seen that considerable economies are also possible in this direction.

Calculation of Boiler Efficiency.

The relationship between the quantity of heat units supplied in the fuel and delivered as steam may be regarded as the overall boiler efficiency. The figure is usually expressed as a percentage.

The quantity of heat units supplied in the fuel is calculated from (*a*) weight of fuel and (*b*) net calorific value at known moisture content; the quantity of heat units delivered in the steam from (*a*) weight of water evaporated and (*b*) pressure at which steam is delivered.

Losses in efficiency occur in the following ways: (*a*) moisture content of fuel, (*b*) unburnt fuel in ash, (*c*) sensible heat in flue gases, (*d*) combustible gases and solids in flue gases and (*e*) heat lost from the boiler by radiation and otherwise.

As far as palm oil factory practice is concerned, the above losses may be divided into avoidable and unavoidable losses. Attention has already been drawn to the importance of reducing as far as possible the moisture content of any waste product used as fuel, while the presence of an excess of unburnt fuel in the ash is a reflection on the capabilities of the attendant in charge of the furnace.

Although in large steam-raising plants flue gases are used as a source of heat for the feed-water for the boilers, the consumption of fuel in the average palm oil factory is not considered large enough to warrant the installation of the necessary plant. The escape of large amounts of smoke and combustible gas (*e.g.* carbon monoxide) into the flue is due to inefficient stoking.

Fuels such as nut-shells and oil-free pericarp residue and even wood, being largely made up of carbohydrate, contain roughly 50 per cent. of oxygen and 6 per cent. of hydrogen. As a consequence of the already combined oxygen,

Table II.

Details of Fuel Consumption in Boiler Tests.

Serial No. of Test	Duration of Test	Nature of Fuel Consumed.								
		Nut-Shells			Pericarp Residue Oil content 22 per cent.			Timber		
		Amount	Moisture Content	Calorific Value	Amount	Moisture Content	Calorific Value	Amount	Moisture Content	Calorific Value
	hours	lbs.	per cent.	B.T.U.	lbs.	per cent.	B.T.U.	lbs.	per cent.	B.T.U.
No. 1	3				749	38.0	6260	672	22.0	6290
No. 2	3	777	21.0	6910	554	44.0	5550	560	29.0	5630
No. 3	2	517	21.0	6910	320	49.0	4950	336	28.0	5730

Note.—The calorific values given in this table are corrected for the moisture present in the fuel. Since 1 lb. of a fuel containing 6 per cent. hydrogen will yield 0.54 lb. of water when burnt, a further 590 B.T.U per lb. of dry fuel must be deducted.

more than half the weight of the fuel is useless from the start as a source of heat, and since the hydrogen on combustion must yield water amounting to over half the weight of the fuel, the heat necessary to vapourise this water is lost. This, however, is really a matter of fuel efficiency and strictly has nothing to do with the question of boiler efficiency, for once any given fuel is chosen its innate disadvantages are inseparable from it. No amount of skill in boiler design or operation can alter the net calorific value of nut shells or pericarp residue. All that can be done to the fuel is to make it as dry as possible before firing, though a moisture content of roughly ten per cent. has to be faced under the best conditions.

Summary of Boiler Tests at Serdang.

Records of three boiler tests carried out in the palm oil factory at Serdang are given in Tables II, III and IV. Table II gives the details of fuel consumption; Table III those of the net heat generated; Table IV those of water consumption, while the composition of the furnace ash is shown in Table V. The calorific value of the combustible material in the ash has been taken as 6000 B.T.U.

As a result of the data available a statement showing the overall boiler efficiency in each case, has been compiled and is shown in Table VI.

Table III.
Net Available Heat From Fuel.

Serial No. of Test	Nut-shells	Pericarp Residue	Timber	Total
	million B.T.U.	million B.T.U.	million B.T.U.	million B.T.U.
No. 1	—	4.415	3.919	8.334
No. 2	5.008	2.892	2.918	10.818
No. 3	3.331	1.488	1.782	6.601

Note.—In the above table it has been assumed that all the fuel contained 6 per cent. of hydrogen.

Table IV.
Details of Water Consumption in Boiler Tests.

Serial No. of Test	Duration of Test	Amount of Water Consumed	Average Boiler Pressure during Test	Heat delivered in Steam
	hours	gallons	lbs. per sq. inch	million B.T.U.
No. 1	3	390	140	4.423
No. 2	3	400	135	4.532
No. 3	2	290	120	3.280

Table V.

Composition of Ash from Boiler Furnace.

Serial No. of Test	Duration of Test	Amount of Ash	Loss on Ignition
	hours	lbs.	per cent.
No. 1	3	14.0	18.3
No. 2	3	17.5	22.9
No. 3	2	14.0	11.1

Table VI.

Boiler Control Statement.

	Test No. 1	Test No. 2	Test No. 3
	million B.T.U.	million B.T.U.	million B.T.U.
Heat supplied by fuel ...	8.334	10.818	6.601
Heat delivered in steam ...	4.423	4.532	3.280
	per cent.	per cent.	per cent.
Boiler efficiency ...	53.1	41.9	49.7
Loss in unburnt fuel ...	0.2	0.2	0.1

The loss due to unburnt fuel in the ash is trivial, and the very large loss of the order of 50 per cent. occurs largely in the flue gases. A direct measurement of the heat lost in the flue can only be made by recording the temperature of the escaping gases and analysing them at intervals throughout the test. The loss in the flue gases would be greater in the second test, when the regular attendant was absent and was replaced by a labourer with little previous experience. The effect of the personal factor is marked.

It will be understood that Table VI indicates strictly the boiler efficiency; that is, the proportion of heat utilised to generate steam to the total heat that the fuel, as burnt, was capable of producing. Had the fuel been more thoroughly dried it could have produced more heat, and this aspect of fuel efficiency is just as important as the actual boiler efficiency. For example, it can be calculated from Table II that in test No. 1, 358 lbs. of water in excess of the standard 10 per cent. had to be evaporated from the fuel; in test No. 2, 380 lbs.; and in test No. 3, 241 lbs. Table VII shows the heat lost through the presence of excess moisture.

Table VII.

Loss of Heat Due to Excess Moisture Over 10 Per Cent.

	Test No. 1	Test No. 2	Test No. 3
Heat lost, B.T.U. ...	394,000	418,000	265,000
Heat lost expressed as percentage of heat supplied to boiler ...	4.7	3.9	4.0

A moisture content of some 10 per cent. is inevitable in air-dry fuel of the type considered, and for practical purposes may be regarded as being, like the hydrogen content, characteristic of it.

Conclusions.

In palm oil factory practice, there is a large amount of combustible waste material which ought to be made as nearly as possible to supply all the fuel required for raising steam without bringing in wood which is eventually bound to become less cheaply available.

For the furtherance of this end, it is necessary to improve if possible the efficiency of fuel and boiler; also to improve consumption.

The waste materials are not indeed efficient fuels, and all that can be done is to bring them to an air-dry condition before firing, thus minimising the losses due to evaporation of moisture.

The boiler once installed is scarcely capable of alteration, but there is scope for large economies in the method of firing, the aim being to effect complete combustion of the fuel without any excess draught. Given a suitable boiler this depends on the skill and training of the boiler attendant.

Waste of steam should be avoided by adequate heat insulation and the utilisation of exhaust steam to heat the boiler feed water. The steam engine should be one working efficiently at the normal pressure of the boiler.

These points, as illustrated by the palm oil factory at Serdang, have been tested and discussed, numerical values of the boiler efficiency being given.

In conclusion, the writers wish to acknowledge the assistance received from Mr. P. A. Bray, Superintendent, Bungsar Power Station, both as regards affording facilities for the determinations of the calorific values of the various materials and advice in the compilation of the boiler control statements.

THE PADI STRAW MUSHROOM IN KEDAH

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The culture of the padi-straw mushroom, *Volvaria volvacea* (Bull) Quel, was described by J. A. Baker in the *Malayan Agricultural Journal* for December 1933. It has recently been discovered that the fungus occurs naturally in Kedah and has long been known to the Malays as *"kulat jerami"* .

Following the publication of the article referred to above, the Department of Agriculture introduced spawn of the mushroom from Province Wellesley and from it raised a few specimens in a specially prepared bed of padi-straw in Alor Star. After the harvest early in 1934, another bed was formed at the Telok Chengai Experiment Station and sown with spawn from the original one. Owing, it is thought, to rather dry weather conditions, not a single mushroom was produced. The straw from this sterile bed was subsequently scattered over the padi field in which it was situated and ploughed into the soil.

As it was hoped to obtain a large supply of spawn from the bed, a considerable quantity of straw was collected in the Station and made into a small stack to provide material for further experiments. The stack was roughly covered with *'atap'* to keep out rain and preserve the straw; it was not disturbed in any way. The temporary roof decayed in due course and rain-water entered freely. Following four months of heavy rainfall—July to October—the straw partially decayed.

At the beginning of November, exceedingly fine specimens of Volvaria, which were often six inches, or more, in diameter, commenced to be produced near to the base of the stack. As the mushroom grew without the artificial introduction of spawn, it was evident that it had occurred naturally.

When specimens were shown to Malay padi-planters they immediately recognised them and could recall numerous instances when supplies of the fungus had been collected from heaps of straw used for bedding for live-stock and other purposes, or left undisturbed in the field after the padi had been thrashed. In order to confirm these statements investigations were made in the Kota Star District in the month of November and many examples were discovered on large heaps or stacks of straw.

The fungus appears to be indigenous and widely distributed. Under natural conditions fruiting bodies are produced chiefly during the long wet-season which, in Kedah, extends from June to November. The mushroom is much prized as an article of food, especially by Chinese; as it can be dried successfully it can be preserved indefinitely.

During the long wet-season the fungus could, without doubt, be cultivated and produced in quantity, and also in drier months of the year, provided close attention were paid to watering and the shading of the tops and sides of the

FIG. I. *Volvaria volvacea* growing naturally on padi straw

FIG. II. Specimens of *Volvaria volvacea* showing general characters.

beds to maintain humid conditions. It is now considered that partial, or complete failure to grow the mushroom in the past has been due, more particularly, to the absence of suitable protection from sun and wind.

The photograph, Fig. 1, shows the mushroom growing near to the base of a heap of padi-straw, and Fig. 2, the characters and general appearance of the fungus. The specimens shown in each photograph were produced on straw that was freshly collected in the field after harvest, and no spawn from a previously infected source, such as a cultivated bed, was mixed with it.

NOTE ON THE FROTHING OF GROUNDNUT OIL

BY
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Enquiries have been received recently regarding the possibility of eliminating the frothing effect which is noticeable when certain brands of groundnut oil are heated.

This frothing tendency is more marked with the local oil than with the imported oil.

Experiments carried out by the Chemical Division show that frothing can be correlated both with the mode of expression of the kernels and with the extent to which the crude oil is refined before use.

If the kernels are crushed and the meal pressed without heating, the resultant oil after filtration does not exhibit any frothing tendency. If, however, the residue from the cold expression is ground and the meal heated and pressed to recover a further quantity of oil, the latter, even after filtration, froths on heating. A similar effect is noticeable with oil recovered by grinding the kernels to a fine state of division and subjecting the heated meal to a single heavy pressing.

By allowing the filtered oil from the subsidiary treatment of the meal or from the whole treatment of the kernels after grinding and heating to settle for a period of a fortnight or three weeks and then drawing off the supernatant oil without disturbing the sediment it will be found that the frothing tendency can be practically eliminated from the settled oil. Alternatively, if the crude oil is treated with caustic soda, the refined oil, after washing with water to remove soluble soap and excess alkali followed by filtration, will not be found to froth when heated. Treatment with caustic soda removes in addition the free fatty acids present in the oil.

As far as can be ascertained therefore, frothing is due to the presence of very small amounts of kernel tissue which pass through with the oil when expressed and which are not removed as a result of the ordinary filtration process. The amount of extraneous matter is very small as frothing is not accompanied by the separation of any perceptible amount of coagulable matters, for example, mucilage or proteid substances, which are also present in the kernels.

It is reasonable to suppose that by grinding the kernels to a fine state of division and by subjecting the heated meal to a heavy pressing there will be a tendency for an increased amount of kernel tissue to be expressed with the oil.

Further, it is well known that sedimentation of an oil is accompanied by the formation of a precipitate which occludes any extraneous matter that may have been expressed originally with the oil.

While sedimentation is more economical than refining the oil with caustic soda, the former process involves the provision of storage tanks in which the oil can be left undisturbed for the required period.

An alternative solution would appear to consist in recovering the available oil by two stages; a cold-pressed oil which could be filtered and marketed, a smaller quantity of hot-pressed oil which would require to be settled as described. In this case much less storage tank accommodation would be required.

The adoption of this method of treatment would bring local oil mill practice into line with established European practice for the treatment of oil seeds in which the latter are invariably crushed and pressed in the cold, thus recovering approximately 70 per cent. of the available oil as a "first quality oil". The remainder of the available oil is recovered by reducing the residue to a fine state of division, and hot-pressing the meal. This oil is always regarded as "second quality" compared with the cold-pressed oil.

CONDITIONS ON SMALL RUBBER HOLDINGS IN MALAYA.

4th Quarter, 1934.

Prepared by the Economics Branch of the Department of Agriculture, Straits Settlements and Federated Malay States, in collaboration with the Field Branch of the Department.

Rainfall.

The outstanding feature of the weather conditions of the quarter was the exceptional dryness of December experienced throughout Malaya. October and November were, as usual, wet months and normal rainfalls were recorded.

Prices.

There was a distinct fall in prices paid for small-holders' rubber during the last quarter of 1934, although in a few cases the higher levels of the previous quarter were reached.

Table I shews the lowest and highest prices at which rubber was purchased by dealers in each State and it will be seen that the difference between the extremes has increased to a certain extent.

Table II should be read in conjunction with Table I and shews the mean of lowest and highest prices paid at a number of centres in each State during the quarter.

Production.

Table III, which is included for the first time, shews the total production of small holdings for the year 1934, and, for the purpose of comparison, the production of each quarter. This table is compiled from the monthly report of stocks, production, imports and exports of rubber, published by the Registrar-General of Statistics, Straits Settlements and Federated Malay States.

Tapping.

Most reports indicate that the heavy rains of October and November resulted in severe tapping in December to cover coupon requirements. In Pahang South, towards the end of the year, tapping was stopped in a number of holdings owing to the padi harvest. More conservative tapping was reported from Negri Sembilan—ten to sixteen days monthly—and high tapping was much in evidence with double tapping cuts. The improvement in tapping methods was continued in South Kedah. Reports from Perak indicate that there is a general tendency towards much more careful tapping than formerly in respect of rubber recently brought into bearing for the first time. In Malacca tapping continued to be heavy throughout the quarter.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul (133 1/3 lbs.))

4rd Quarter 1934.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				OCTOBER				
Smoked sheet	23.00-30.00	20.40-29.90	24.00-29.00	23.00-30.00	20.00-30.10	23.00-29.00	24.00-31.00	22.00-30.60
Unsmoked sheet	20.00-28.50	20.00-26.50	22.00-28.00	20.00-28.30	20.75-28.00	21.00-27.00	22.00-26.00	17.50-28.80
Scrap	10.00-15.00	4.00-16.50	13.00-16.00	13.00.16.00	—	13.00-15.00	9.00-15.00	2.00-15.00
				NOVEMBER				
Smoked sheet	21.50-28.00	17.95-26.45	21.00-28.00	20.00-28.30	21.00-26.40	22.00-25.00	23.00-27.50	20.00-26.60
Unsmoked sheet	18.00-27.00	18.00-25.00	19.00-23.00	18.00-24.60	18.00-22.60	20.00-23.00	18.60-24.30	17.00-26.00
Scrap	8.50-18.00	12.00-15.00	12.00-15.00	11.00-13.00	10.00-11.00	12.00-14.00	8.00-14.00	3.00-17.50
				DECEMBER				
Smoked sheet	21.50-26.50	18.75-26.00	22.00-25.00	13.00-26.20	20.00-25.50	23.00-25.00	20.00-25.46	20.00-25.00
Unsmoked sheet	18.00-24.50	19.00-23.60	19.00-22.00	19.00-24.00	18.75-24.00	21.00-24.00	21.00-23.50	18.00-23.50
Scrap	9.00-17.00	12.50-14.00	10.00-15.00	12.00-16.50	—	13.00-15.00	12.00-14.00	3.00-14.00

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul (133 1/3 lbs.))

4th Quarter 1934.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				OCTOBER				
Smoked sheet	26.37-28.12	25.57-27.88	25.63-28.33	24.80-28.45	23.58-27.83	24.33-27.00	25.77-28.00	25.00-27.64
Unsmoked sheet	23.90-26.30	23.85-25.49	23.75-26.25	22.17-26.22	22.45-25.99	22.66-25.33	22.75-24.87	21.92-25.10
Scrap	11.00-14.50	14.00-14.75	13.25-15.25	13.00-14.50	—	13.66-15.00	11.87-13.18	10.57-12.23
				NOVEMBER				
Smoked sheet	23.00-26.12	22.89-24.39	22.58-25.25	21.87-25.82	21.29-24.29	22.33-23.66	24.00-25.62	22.35-24.23
Unsmoked sheet	21.30-25.10	20.27-22.73	19.50-21.75	19.67-22.85	19.30-21.82	20.66-22.33	21.27-23.08	19.97-22.58
Scrap	12.00-14.50	13.50-14.50	12.25-14.50	11.00-13.00	10.00-11.00	12.66-13.66	10.75-12.25	9.53-12.23
				DECEMBER				
Smoked sheet	23.37-25.25	23.82-24.47	22.75-24.25	20.57-23.48	21.00-24.07	23.66-25.00	22.50-24.47	22.32-23.81
Unsmoked sheet	20.90-23.56	20.06-22.18	20.00-21.33	20.33-23.08	19.35-22.46	21.66-23.33	21.62-22,50	20.52-22.40
Scrap	11.50-13.87	12.75-13.50	11.25-14.50	12.50-14.75	-	13.33-14.66	12.67-13.67	8.91-10.77

Table III.

Production of Rubber on Small Holdings during the year 1934.
(in tons)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total for year
Federated Malay States ...	32,492	24,211	23,158	24,280	104,141
Unfederated Malay States ...	22,094	19,343	20,363	19,659	81,459
Straits Settlements ...	7,823	6,871	6,831	9,878	31,403
Total ...	62,409	50,425	50,352	53,817	217,003

Areas out of Tapping.

Estimates of areas untapped on small holdings were as usual obtained by counting the number of such areas and applying the percentage thus obtained to the total area of small holdings in the District.

Table IV shews the result of the survey in December, and a slight increase is noticeable in the areas which have come into tapping. The total of areas out of tapping on small holdings in the Federated Malay States was estimated to be 41,000 acres at the end of December, 1934, as compared with 42,600 acres at the end of the third quarter. The relative figures for the Straits Settlements were 11,600 acres and 13,900 respectively.

Condition of Holdings.

The general standard of upkeep of small-holdings continued to shew improvement, the clearing of undergrowth receiving an impetus due to the fear of low assessment for overgrown areas. In Perak Central a few young holdings were brought into tapping. Reports from Penang and Province Wellesley state that bark consumption was heavy during the quarter and wounding general. A few Chinese in the Kuantan District are reported to have been digging new catchment pits to prevent soil wash; the general practice, however, is to allow a natural cover to grow which is slashed at regular intervals.

Diseases.

Mouldy Rot was the only disease which called for particular comment during the wet months of October and November, but the exceptional dry weather of

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres, at the end of December, 1934.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	37,288	1,100	3	Klang	18,879	1,100	6	Seremban	19,241	1,300	7	Raub	7,361	100	1
Kinta	34,180	1,700	5	Kuala Langat	29,263	2,000	7	Tampin	17,947	1,800	10	Kuala Lipis	15,951	2,100	13
Kuala Kangsar	43,485	2,600	6	Ulu Langat	38,867	4,300	11	Kuala Pilah	17,470	1,000	6	Bentong	13,600	3,500	26
Upper Perak	13,774	1,100	8	Ulu Selangor	30,632	1,500	5	Jelebu	6,270	300	4	Other Districts	31,223	4,700†	15†
Larut & Selama	51,407	3,600	7	Kuala Lumpur	21,174	1,600	8†	Port Dickson	10,653	700†	7†				
Krian	9,751	1,300	13	Kuala Selangor	9,379	700	8†								
Lower Perak	47,937	2,900*	6*												
	237,822	14,300	6		148,194	11,200	8		71,581	5,100	7		68,135	10,400	15

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	17,687	1,400	8	North	3,241	300	8	Singapore	12,781	300	2
Alor Gajah	31,387	4,100	13	Central	7,067	1,300	18				
Jasin	24,971	1,200	5	South	8,149	nil	nil				
				Dindings	7,279	2,100	29				
				Penang	11,114	900	8				
	74,045	6,700	9		36,850	4,600	16		12,781	300	2

The percentage of areas out of tapping in September, 1934, was as follows:—Perak 6, Selangor 6, the Negri Sembilan 12, Pahang 15, Malacca 11, Penang and Province Wellesley 15, Singapore 3.

* Estimated from percentage for Kuala Kangsar.

† Estimated from percentage for other Districts in the State.

December greatly assisted its control. Wide use was again made of fungicides sold through Departmental channels, a preference being shown for proprietary products incorporating colouring matter which can be more readily seen when painted on the tapping panel.

In Perak, persistent reports of damage by root disease were received which will receive further investigation; there would appear to be little doubt that in some localities, root disease—probably mainly *Ganoderma pseudoferreum*—is more prevalent in small holdings than has been supposed to be the case.

Grades of Rubber.

There was again considerable variation in the grades of rubber purchased by dealers, thus apparently indicating that there is no definite preference for either smoked or unsmoked sheet. The reports from the various States are analysed below, but sales of scrap are ignored as being negligible except in the case of Johore.

Kedah.—In contrast with the third quarter, there was an increase in the percentage of unsmoked sheet except in the case of the Kota Star District which shewed a slight increase in smoked sheet explained by a reduction in scrap. Average percentages were:—Kota Star: smoked 85, unsmoked 13; South Kedah: smoked 56, unsmoked 43; Baling: smoked 27, unsmoked 69; Central Kedah: smoked 46, unsmoked 50.

Johore.—The proportion of smoked and unsmoked sheet shewed little change, but the tendency was to a slight increase in unsmoked sheet with a higher percentage of scrap. Muar, Batu Pahat and Tangkak respective percentages of smoked sheet were 57, 80 and 81, while the percentages of unsmoked sheet at Panchor, Senggarang, Benut, Kukup and Pontian were 90, 85, 78, 95 and 90 respectively. The percentage of scrap varied principally from 10 to 22.

Perak.—In the District of Krian and Selama Sub-district there was no change recorded in the proportion of grades purchased as compared with the previous quarter. The percentages were:—Krian: smoked 30, unsmoked 70; Selama: smoked 80, unsmoked 20.

There was a slightly increased proportion of smoked sheet in Perak North and Perak South, the average for all centres in Perak North being 34 per cent. as compared with 28 per cent. in the last quarter. For Perak South the respective averages were 37.3 per cent. as compared with 33.6 per cent.

Comparing the Perak North figures with those for the first quarter of the year, a very considerable increase in the proportion of smoked sheet dealt in is indicated.

In Perak Central there was a slight increase in unsmoked sheet at Kuala Kangsar, the figures being smoked 56 per cent., unsmoked 41 per cent. At Lenggong the position was reversed, the proportions being: smoked 28 per cent., unsmoked 72 per cent.

Selangor.—Smoked sheet continued to be made in the coastal Districts and more interest was taken in this grade in the inland Districts as the small-holders realised that it was not profitable to sell unsmoked sheet with coupons.

Penang, Province Wellesley and Dindings.—In Penang, sales were again entirely of unsmoked sheet with a small proportion of scrap. In Province Wellesley, sales were principally of unsmoked sheet but in the Dindings the proportions were : smoked 51 per cent., unsmoked 43 per cent.

Malacca.—The percentages of purchases were as follows :—Central : smoked 61, unsmoked 29; Alor Gajah : unsmoked 92.40, scrap 7.60; Jasin : smoked 64, unsmoked 34.

Negri Sembilan.—There was again considerable variation in the grades sold in the various Districts and the average percentages for the State were :— smoked 53.2, unsmoked 45.3.

Pahang.—In the Kuantan District all rubber is sold as smoked sheet. In Pahang South, 95 per cent. of the Chinese produce smoked sheet, but only 5 per cent. of the Malays, the product of the latter being mainly in the form of unsmoked sheet.

General.

In Perak the Asiatic Rubber Instructor has included in his lectures a reference to the special advisability under the present rubber regulations for small-holders to sell only fully dried smoked sheet, and has pointed out the loss they incur in selling wet rubber covered by coupons up to its full wet weight. Action is being taken to instruct all Department officers in Perak to take every opportunity of making this information widely known.

No cases of cutting out of rubber in favour of food crops have occurred, but in Sitiawan, Perak, applications for kampong land for food crops have been made since rubber regulation was introduced.

Selected Article.

RUBBER UNDER THE RESTRICTION SCHEME*

Price, Stocks, and Consumption Prospects

BY
J. E. NATHAN.

The preamble to the international rubber agreement states as the first object of the scheme the reduction of existing world stocks to a normal figure. At the beginning of May, when the agreement was signed, stocks of rubber in the United Kingdom and the United States of America, afloat from the East, and in the ports of Singapore, Penang, and Colombo, amounted roughly to 625,000 tons; at the end of September they totalled 655,000 tons, and by the end of the year it is certain they will be appreciably higher.

It is not surprising, therefore, that the recent decision of the International Committee to increase the rate of release from 70 per cent. in December to 75 per cent. in the first quarter of 1935 came as a shock to the market. It is a clear indication that the committee do not at present desire a higher price, and that in order to keep the price from rising they have been compelled to ignore the stock position. The decision came as no surprise to those who have studied the working of the scheme in the Dutch East Indies, but it was an unpleasant shock to speculators, who have bought rubber for forward delivery at much higher prices.

Native Rubber in D.E.I.

It is the control of native rubber in the Dutch East Indies which is causing all the difficulties. In Malaya every small native holding is surveyed and registered; the District Land Officer knows how much rubber each native owns, can assess his production, and issue export permits similar to those issued to large estates. In Sumatra and Dutch Borneo, however, there are vast areas of native rubber unsurveyed and unregistered; to introduce a system of individual licences would entail a long period of preliminary work. The Government have, therefore, endeavoured to keep the exports of native rubber within the quota by means of a heavy export tax, at present about 3d. per pound. A price of 6¼d. in London is equivalent to 5⅜d. in the Netherlands East Indies for standard rubber, and, as native rubber is worth appreciably less than standard, it will be seen that at present prices the native gets comparatively little for his rubber. Only those natives whose holdings are within a reasonable distance of the port of export find it worth while to tap their rubber; the more distant holdings are not tapped and so the exports are kept down.

Apparently there is little dissatisfaction with the system among the native growers. It must be remembered that during the slump native owners far in the interior ceased to tap their rubber, owing to the low price, and turned their attention to other products. To-day they are appreciably better off, in

*Reprinted from *The Manchester Guardian Commercial*, 7th December, 1934.

that their taxes have been remitted, and the Dutch Government is carrying out public works of many kinds in these districts. It is using the proceeds of the heavy export tax, which already amount to over £1,500,000, to construct roads and build schools and hospitals.

It is clear that under this system every advance in price expands and every fall in price contracts the circle within which it is profitable for the natives to tap and sell their rubber. When the price was 7½d., Dutch native exports were about 15,000 tons a month; at the price of 6¼d. they appear to be about 6,000 tons a month. The permissible export in the first quarter of 1935 is 10,500 tons a month, so that 7d. is apparently the price which would keep these native exports in line with their quota, as long as the export duty remains unchanged.

While this system is unquestionably the easiest to administer it cannot but be unsatisfactory to the other signatories of the scheme and also to the European estates in the Dutch East Indies.

Fortunately there are signs that the Netherlands East Indies Government is making serious attempts to evolve an alternative method. The individual assessment system is to be introduced in some of the smaller areas at the beginning of next year, and while this method may be impracticable in Borneo and South Sumatra it should be possible to carry out regulation there by some method of district quotas and Government monopoly of purchase.

In June, 1934, the releases were fixed on a very liberal scale, in order to give the Netherlands East Indies Government time to overcome its administrative difficulties. The release for the first quarter of 1935, which is again a generous one, means that further time is required for this purpose, but nevertheless it is certain that early in 1935 world stocks will begin to be reduced.

Rising Consumption.

If we turn from the regulation of production to consideration of the consumption of rubber, the picture is a bright one. Consumption figures for the last three years are as follows:—

	1932	1933	1934 (Nov. and Dec. estimated)
	Tons.	Tons.	Tons.
United States	332,100	405,700	440,000
Rest of the world	354,500	410,000	475,000
Total ...	686,600	815,700	915,000

1932 was, of course, a year of low absorption; in 1929 world absorption was just over 800,000 tons, and the year 1933 did no more than mark a return to that level. The increase in 1934, however, of over 12 per cent. over 1933 is most encouraging, and there appears to be a fair prospect of the absorption next year being close on 1,000,000 tons.

The United States is the only country publishing data which divides the absorption of rubber according to the classes of goods in which it is used. Statistics show that in 1933 in the United States 77 per cent. of the rubber used went into motor-car tyres and 23 per cent. into other goods. The latter percentage has gradually risen, but very slowly, from 17 per cent. in 1929.

Such data as are available for other countries tend to show that between 50 per cent. and 60 per cent. of the rubber absorbed is in motor-car tyres and tubes, and that, as in the United States, this percentage tends to decrease every year. It may roughly be said that motor-car tyres and tubes accounted for three-quarters of the world's absorption of rubber in 1929 and two-thirds in 1933.

The peak year of motor-car registration was 1930; in that year there were 26,697,000 cars registered in the United States and 9,200,000 in other countries. In 1933 the United States figure had dropped to 23,800,000, but the cars registered in other countries had risen to 9,500,000.

U.S.A. Car Output.

In 1929 the output of cars in the United States was 5,358.000; in 1932 the output was 1,371,000 cars, and this figure rose to 1,959,000 in 1933 and to 2,217,000 for the first eight months of 1934. Next year the Ford Company plan to produce a million cars, and with even a moderate improvement in general conditions in America the output of motor-vehicles is certain to show a further increase.

Factory stocks of tyres at the end of August were 8,697,000, compared with 11,981,000 at the end of April and a peak figure of over 13,600,000 in 1928. With the increase in prosperity there is no longer a tendency for owners to run their tyres down to the canvas, and both from the point of view of car production and tyre replacement 1935 promises to be a good year.

A moderate estimate of American absorption of rubber next year would be 460,000 tons, and it may easily be nearly half a million tons.

The following table shows the absorption figures for the last three years in the chief rubber-consuming countries outside the United States :—

	1932	1933	1934 (Oct. / Dec. estimated)
	Tons.	Tons.	Tons.
United Kingdom	78,000	79,000	105,000
Japan	56,000	67,000	70,000
France	42,000	63,000	52,000
Germany	45,000	54,000	55,000
Russia	30,000	31,000	52,000
Italy	15,000	19,000	20,000
Scandinavia	7,000	7,000	10,000
Australia	12,000	13,000	12,000
Canada	21,000	19,000	27,000

It must be emphasised that these figures are absorption figures; they include any additions to invisible stocks, but on the other hand they exclude rubber which has been taken from invisible stocks accumulated in previous years. In the case of the United Kingdom it is probable that invisible stocks have increased and that the real consumption is appreciably less than 105,000 tons. In France, however, it is almost certain that manufacturers have drawn on stocks accumulated before 1934, while Germany imported at the rate of 75,000 tons per annum in the first half of the year, and during the second half has been using the surplus she then accumulated.

Russian Rubber Industry.

The rubber industry in Russia is making phenomenal progress, but unfortunately one of the chief aims of the Russian Government is to make the country independent of imported rubber. With this object in view they are doing their utmost to develop rubber-producing plants, mainly the plant called Tan-sagiz, within their own territories, and have also constructed a number of large factories to produce synthetic rubber from alcohol. The output of natural rubber is said to be negligible at present, not more than a few hundred tons, and although a production of over 12,000 tons is planned for 1940 it is improbable that anything like this figure will be reached.

As regards synthetic rubber, however, much more intensive work is being carried out, and the output in 1934 will certainly total 5,000 tons The quality appears to be fairly good, and the cost, though far higher than that of imported rubber, is a matter of indifference to the Government, as the money is all spent in Russia.

It is quite possible that in a few more years Russia will herself produce as much rubber as she consumed in 1933, but her production of tyres and rubber goods is growing so rapidly that in spite of this her imports of rubber will probably go on increasing for several years to come.

For the first three months of 1935 the percentage of release has been fixed at 75; the quotas are increased next year to 1,088,000 tons and monthly exports of rubber may be calculated as follows:

	Tons.
Countries included in the scheme	68,000
Rest of the world	5,000
	73,000

Against this figure of 219,000 tons for the first quarter of the year absorption is likely to be 250,000 tons, so that world stocks, which have steadily increased in 1934, will show an appreciable decline. April, May, and June are usually the months of heaviest consumption, and if the release is maintained at 75 per cent. the process of reducing world stocks to normal, the first object of the regulation scheme, should be accelerated.

Difficulties Being Overcome.

During the past few weeks there has been from time to time great nervousness both in the rubber market and the rubber share section of the Stock Exchange. Surprisingly few investors had any knowledge of the practical difficulties entailed in organising the administration of the regulation scheme in the East, and were inclined to panic on any sign that everything was not proceeding smoothly. Those who had such knowledge, expected in the first year of administration far more hitches than have actually occurred; at the same time they were and are confident that such difficulties will be overcome, and that the scheme will run at least for the agreed period of 4½ years.

The suggestion in a section of the London press that the Dutch Government is already desirous of breaking an agreement which it signed a few months ago may be ignored. It could not have been made by anyone with knowledge of the Dutch character; there is no nation more scrupulous in honouring its bond.

Reviews.

Rubber and Agriculture.

64 pp. Illustrated. The Rubber Growers' Association, London, 1934.

The production of suitable tyres has been responsible to a large degree for the development of mechanical arable farming. While the use of rubber in other directions on the farm has also proved of value, its material help as an accessory in those implements which prepare the soil for the reception of the seed or are used in connexion with harvesting is rightly given first consideration in this book.

It is claimed that the introduction of rubber tyres to farm implements and vehicles on the farm has not only lightened the burden of farm work but has resulted in the speeding up of production.

These claims are not exaggerated. The importance of taking advantage of suitable weather conditions is recognised as a necessity of good farming. Such weather conditions are often of short duration and under the older methods of farming, the advent of adverse weather frequently overtook the farmer, with disastrous results to the quality and quantity of his crop. The speed with which farm work can be performed with suitable mechanised gear has enabled him, to a large extent, to take full advantage of suitable spells of weather.

The old type of tractor wheel was liable to pack the soil and therefore could not be efficiently worked, especially for harrowing and light cultivation. This problem was not solved by the advent of the high-pressure tyre; such tyres were found to be unsatisfactory, due possibly to a combination of cost, high air pressure and the lack of a proper non-skidding design.

The introduction of low-pressure tyres to aeroplanes enabled these machines to operate regardless of field conditions. This observation led to the idea that large-section tyres could with equal advantage be used in connexion with farming operations. Subsequent tests have proved that higher speeds are obtainable; there is greater economy of fuel, a reduction of vibration and reduced wear and tear on tractors equipped with suitable low-pressure tyres.

This book may be looked upon as an introduction to the consideration of the wider use of rubber in farmwork. While prominence is given to the use of rubber equipment for tractors and pneumatic equipment for horse or tractor-drawn vehicles, attention is also drawn in other sections of the book to such uses as moveable floors for lorries, rubber for cow stalls, its use in the dairy and farmhouse, and to other uses of rubber in agriculture.

The numerous illustrations are of considerable aid to the text and the publication presents a convincing argument in favour of the extended use of rubber in agriculture.

D. H. G.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports submitted by Field Officers.

The Weather.

With the exception of the coastal areas along the eastern seaboard where heavy rainfalls in excess of the average were experienced, normal weather conditions for January prevailed throughout the Peninsula.

Remarks on Crops.

Rubber.—Prices in most centres remained steady during the month, and were comparable with those ruling at the close of the year.

Dry weather conditions, which have persisted since early in December, have accelerated wintering and crop production is reported to have declined. Weather conditions have also favourably reacted on the incidence of fungus diseases, more particularly mouldy rot disease of the renewing bark, which has in consequence been little in evidence.

Padi.—In the Jelebu District of Negri Sembilan, the riverine areas of the Lipis and Pekan Districts of Pahang, Segamat District in Johore and the majority of producing centres in Selangor, harvesting has been completed, and good progress under favourable conditions has been made in North Kedah and Kuala Muda, Province Wellesley North, Rembau, Tampin and Kuala Pilah in Negri Sembilan, the early planted inland areas of Malacca, the Raub and road mukims of Lipis in Pahang, Muar, Endau and Pontian in Johore, and in Krian and parts of the Central Districts of Perak.

Extensive flood damage in the riverine mukims of Perak has been suffered, and crop prospects are poor in consequence. In the newly developed Panchang Bedina area of Selangor, transplanting has been delayed owing to the lack of adequate water supplies, and it is unlikely that planting will now be undertaken in the northern portion of the area.

Crop prospects generally are as yet difficult to estimate. Extensive flood damage which occurred earlier in the year will materially affect the Kedah yield, and dry conditions in the late planted areas of Province Wellesley and Malacca have militated against the development of crops in those areas. In Krian, however, it is considered that with good harvesting weather, returns will not be materially less than those obtained in the previous season.

Coconuts and Copra.—Copra prices advanced sharply at the beginning of the month and touched $5.45 per picul. This price, however, was not maintained and fell rapidly towards the end of the period under review and closed at $4.35. Nut prices fluctuated in concert and at the end of the month varied

between $12 and $18 per 1,000. Fresh nuts for export to Burma from Penang and Province Wellesley advanced to $23 per 1,000.

Copra from improved small holding kilns continues to command satisfactory prices in relation to market quotations.

In some areas, particularly the Kuala Langat District of Selangor, the manufacture of coconut oil by small holding cultivators has increased, and at present prices is found to be a profitable undertaking.

Pineapples.—In Singapore supplies of fruit considerably increased during the month and enabled all factories to commence canning. Supplies in Johore, however, are still somewhat limited and factories are not yet working full time.

New areas continue to be opened up for cultivation in Johore, where factory extensions and improvements are also taking place.

Tuba.—Rapid extensions to the area under this crop are being continued in Singapore where the price of dried root from Changi remains at between $70 to $80 per picul. A good market has been established for cuttings of *Derris elliptica* from the Changi district where prices up to $20 per 1,000 cuttings have been paid for planting material. Appreciable exports of this material were made during the month.

Fruit.—In most centres the fruit season is now nearing an end and supplies are short. A good harvest of rambutans was obtained during the period under review in Province Wellesley South, and durians, langsat, mangosteen and chiku were in bearing in the Jelebu District of Negri Sembilan, where the yields were small and quality poor. Light crops of durians, machang, rambutan, mangosteen, langsat and rambai were obtained in Pahang.

Cloves.—The clove harvest is still in progress in Penang, the dried product being sold at $35 to $38 per picul.

Instructional Tours.

A party of twenty-five Malay agriculturists, including four Penghulus from the Temerloh District of Pahang, paid a three day visit to Malacca, where an instructional programme had been arranged by the local Agricultural Officer.

Improved methods of cultivation, crop maintenance and harvesting were demonstrated and explained at the Rice Experiment Station, Pulau Gadong; poultry management, plant propagation and small holding crops were dealt with at the Agricultural Station, Sungei Udang, and in addition, selected small holding areas were inspected to observe industries, sanitation and other features of general interest. The visitors, who made the tour at their own expense, displayed keen interest throughout, and expressed entire satisfaction with the arrangements made on their behalf. It is expected that further and larger parties will undertake similar visits in the near future.

Rural Lecture Caravan.

The Rural Lecture Caravan made a short tour in Negri Sembilan from January 9th to 16th inclusive, visiting Rantau, Kuala Sawah, Ulu Klawang and Peradong, remaining two days at each centre. Educational films were displayed on the first evening, and the afternoon and evening of the following day were devoted to lectures illustrated by models and lantern slides on subjects of general economic interest to small-holders. In all localities the film shows and evening lectures were well attended and appreciated, but afternoon proceedings were not well patronised except at Peradong where great interest was displayed and numerous points raised by the audience. The total attendances during the tour approximated 3,600.

A short tour in the Ulu Langat District of Selangor was commenced on January 26th, Beranang, Semenyih and Jendram being visited; the programme was similar to that followed in Negri Sembilan. The cinema shows on opening nights attracted from 500 to 800 people, but lectures were not well attended.

DEPARTMENTAL NOTES.

Visit of H.E. The Governor to Serdang.

His Excellency Sir Shenton Thomas, K.C.M.G., O.B.E., Governor and Commander-in-Chief of the Straits Settlements, and High Commissioner for the Malay States, visited the School of Agriculture, Malaya, and the Central Experiment Station, Serdang on 1st February, 1935. He was received by the Acting Adviser on Agriculture and by other officers of the Department of Agriculture connected with the work of the School and the Experiment Station.

Appointments.

Mr. J. Cook, B.SC., has been appointed an Agricultural Officer with effect from 23rd November, 1934. He arrived in Malaya and assumed duty on 20th December, 1934.

Mr. H. K. Ashby, B.A., Cam. Dip. Agr., has been appointed an Agricultural Officer with effect from 23rd November, 1934. He arried in Malaya and assumed duty on 20th December, 1934.

Mr. Choo Kok Leong, B.A. (Agric.) Oxon., has been appointed Assistant Lecturer, School of Agriculture, Malaya, from 1st. January, 1935.

Leave.

Mr. A. Thompson, Mycologist, returned from leave on 4th January, 1935.

Mr. J. H. Dennett, Soils Chemist, returned from leave on 26th January, 1935.

Statistical.

MARKET PRICES.

January, 1935.

Rubber.—There was a slight improvement in the price of rubber during January, but the market weakened at the close of the month. Opening and closing prices in Singapore for spot loose were 20⅞ and 20¾ cents per lb. respectively, the average price for the month for No. 1. X. Rubber Smoked Sheet being 21.25 cents per lb. as compared with 20.75 cents per lb. in December. The average price in London for January was 6.39 pence per lb. and in New York 13.01 cents gold per lb. as compared with 6.30 pence and 12.86 cents gold respectively in December.

Table I.

Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, January, 1935.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.				Kuala Kangsar, Perak.				Batu Pahat, Johore.			
	10	17	24	31	9	16	23	30	9	16	23	30
Smoked sheet				24.40	25.34	24.95	24.88	23.00				
Unsmoked sheet	23.68	22.66	22.01	23.18		21.00	21.04	21.26	21.63	22.07	21.10	20. 5
Scrap	13.30			13.00					13.36		17.17	

Transport by lorry Kuala Pilah to Seremban 15 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

No purchases at Batu Pahat and Kuala Kangsar on 2nd December, and at Kuala Pilah on 3rd December.

Palm Oil.—The following prices for the local commodity were quoted during January, and indicate very clearly the recent considerable improvement in this market.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1935.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
Jan. 4	£ 16. 10. 0	£ 7. 0. 0
„ 11	18. 10. 0	7. 12. 6
„ 18	19. 10. 0	8. 10. 0
„ 25	20. 0. 0	9. 0. 0

Copra.—The spectacular rise in the value of this commodity was the outstanding feature of the Singapore market in January. The improvement had commenced in December, and, opening at $3.30 per picul, the sun-dried grade rose to $5.45 on the 22nd January. This peak figure was, however, only maintained for two days, the price slumping to $4.25 but hardening again to close at $4.40 with an average of $4.21 per picul for the month. The mixed quality moved in sympathy with the better grade and reached a peak of $5.10, averageing $3.91 for the month. The December average prices per picul were $3.16 and $2.91 respectively.

Copra cake improved in sympathy with copra and averaged $2.25 per picul as compared with $1.70 in December.

Rice. The average wholesale prices of rice per picul in Singapore during December 1934 were as follows:—Siam No. 2 (ordinary) $2.95, Rangoon No. 1 $2.86, Saigon No. 1 (long grain) $2.95, as compared with $2.96, $2.95 and $2.92 in November. Corresponding prices in December 1933 were: $3.18, $3.11 and $2.77 respectively.

The average retail market prices in cents per gantang of No. 2 Siam rice in December were:—Singapore 22, Penang 20, Malacca 22, as compared with 24, 20 and 24 respectively in November. The averages for the year 1934 were 23, 24 and 24 cents per gantang respectively, as compared with 25, 27 and 27 for 1933.

The average declared trade value of imports of rice in December was $3.28 per picul as compared with $3.25 in November and $3.36 in October. The average for the year 1934 was $3.15 as compared with $3.40 in 1933.

Padi.—The Government Rice Mill, Bagan Serai, continued to pay $1.50 per picul for padi but towards the end of the month it became necessary to raise the price to $1.60 to $1.65 per picul. The privately owned mill was reported to be paying $1.35 per picul. At the Temerloh weekly fair $1.75 to $2 per picul was paid for padi for the newly opened mill. Prices per gantang varied from 5 cents to 13 cents in different parts of the country.

Tea.—Kedah tea was quoted at 11d. per lb. on the London market in December. Average London prices per lb. during December for tea consignments from other countries were as follows:—Ceylon 1s. 1.04d., Java 10.18d., Indian Northen 11.53d., Indian Southern 11.43d., Sumatra 9.43d. Prices were still on a downward trend.

Tuba Root (Derris).—A marked improvement in the demand for tuba was evident in the Singapore market during January. Prices accordingly were firmer and were advancing rapidly at the close. Good quality roots sold on rotenone content averaged $45 per picul, and roots sold on a basis of ether extract averaged $32.50 per picul. The December averages were $44 and $30 respectively.

Coffee.—There was little change in the Singapore coffee market during January. Sourabaya coffee opened at $19.50 to $20 per picul and after rising to $20 to $21, closed at 19.50 to $20.05. Palembang coffee opened at $13.15 per picul and closed at $13.50, an average of $13.48 for the month as compared with $13 in December.

Local prices for coffee shewed further improvement, ranging according to quality from $20 to $34 per picul in different Districts.

Arecanuts. There was a distinct improvement in this market during January and average prices per picul for the month in Singapore were as follows:—Splits $6 to $6.81, Sliced $9.75 to $11, Red Whole $7.25 to $8, the price in each range depending upon quality.

The average prices per picul quoted by the Singapore Chamber of Commerce were:—Best $7.20, Medium $6.57, Mixed $5.84.

Gambier.—The price of Block again weakened in Singapore during January, closing at $5.00 per picul to average $5.44 for the month. No. 1 Cube retained its improved price but weakened slightly at the close, averaging $11.88 per picul. The average prices per picul for December were $6.15 and $11.60 respectively.

Pineapples.—Prices in Singapore rose steadily during January on increased buying enquiry, but the volume of business passing was somewhat under normal. Average prices per case were:—Cubes $3.29, Sliced Flat $3.14, Sliced Tall $3.35. December average prices were: $3.07, $2.95 and $3.32 respectively.

Local average prices of fresh fruit per 100 were:—Singapore, $3.25 and $2.50 for large and small size respectively; Johore, 1st quality $2.50 to $2.90, 2nd quality $2 to $2.50, 3rd quality $1 to $2; Selangor, 70 cents to $6 according to quality.

Tapioca.—There was again no change in the Singapore market, and prices during January remained at the level of the previous two months: Flake Fair $3.50 per picul, Seed Pearl $5.50, Medium Pearl $5.85.

Sago.—Prices in Singapore advanced during the month under keen buying enquiry but weakened at the close as supplies became freer and demand fell off. Pearl, Small Fair averaged $3.98 per picul and Flour, Sarawak Fair averaged $2.55 per picul. December average prices were $3.70 and $2.31 respectively.

Mace.—Siouw continued unchanged during January at $90 per picul, but Amboina advanced from $60 to $70 per picul, to average $67.50 for the month.

Nutmegs.—The Singapore market continued unchanged throughout the month at the December closing prices. Average prices per picul were:—110's $25.50, and 80's $26, as compared with $25.60 and $26.20 in December.

Pepper.—Prices in Singapore weakened during the month in sympathy with London and on slower demand. Average prices per picul were:—Singapore Black $20.38, Singapore White $62, Muntok White $64, as compared with $20.60, $63.60 and $65.60 in December.

Cloves.—Prices remained nominal in Singapore at Zanzibar $35 and Amboina $45 per picul.

Tobacco.—There was again considerable variation in local prices. In Perak, prices per picul varied from $30 to $65 for 1st quality, $30 to $55 for 2nd quality, $10 to $45 for 3rd quality. Java tobacco was quoted at $40 to $85 per picul. Elsewhere prices ranged from $15 to $60 per picul.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Mackay & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross, London, S.W.1.

GENERAL RICE SUMMARY*

December 1934.

Malaya.—Imports into Malaya of foreign rice during December were 56,896 tons and exports 17,011 tons, net imports being 39,885 tons. Net imports for the year 1934 amounted to 453,229 tons, an increase of 4.4 per cent. as compared with 433,956 tons for the year 1933†.

Of the December imports 49 per cent. were consigned to Singapore, 16 per cent. to Penang, 5 per cent. to Malacca, 23 per cent. to the Federated Malay States and 7 per cent. to the Unfederated Malay States. Of the total, 73 per cent. came from Siam, 25 per cent. from Burma, 1 per cent. from French Indo-China and 1 per cent. from other countries.

Of the exports during December, 74 per cent. were shipped to the Netherlands Indies and 26 per cent. to other countries. The various kinds of rice exported were :—Siam 11,027 tons (64.8 per cent.), Burma 4,444 tons (26.1 per cent.), French Indo-China 449 tons (2.7 per cent.), India 957 tons (5.6 per cent.), local production 134 tons (0.8 per cent.).

India and Burma.—Foreign exports for the period January to November 1934 totalled 1,327,000 tons, a decrease of 24.5 per cent. as compared with 1,758,000 tons in 1933.

Total exports from Burma of rice and bran from the 1st January to 1st December, 1934, amounted to 3,630,041 metric tons as against 3,178,423 metric tons in 1933.

There is reported to be a decrease of about 2 per cent. in the total area under rice in India for the season 1934-35, and a decrease of 0.7 per cent. in the area likely to mature in Burma as compared with the season 1933-34.

Siam.—Exports of rice from Bangkok during November were 196,146 tons, making a total of 1,725,143 tons for the eleven months, as compared with 1,472,268 in 1933.

The official Second Report on the Rice Crop of Siam states that there was an increase of 3.5 per cent. in the area planted in sixty provinces at the end of October as compared with 1933 : the area damaged increased by 34.8 per cent.

Japan.—No further information is available since the November summary.

French Indo-China.—Entries of padi into Cholon for the year 1934 totalled 1,581,481 metric tons, an increase of 45.7 per cent. as compared with 1,085,672 metric tons for the year 1933.

Exports of rice for the year 1934 were 1,575,539 metric tons, an increase of 29 per cent.

The Netherlands Indies.—According to the *Economic Bulletin* dated 17th December 1934, there was a decrease of 2.6 per cent. in the area of rice harvested in Java and Madura during the period January to September 1934.

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* Abridged from the Rice Summary for December, 1934, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1933.

Imports of rice for this period totalled 158,271 metric tons a decrease of 46.8 per cent. as compared with imports of 297,046 metric tons in 1933.

Ceylon.—Imports for the year 1934 totalled 477,631 tons as compared with 439,893 tons in 1933, an increase of 8.6 per cent.

Of the 1934 imports 14.2 per cent. were from British India, 61.5 per cent. from Burma and 24.3 per cent. from other countries.

Europe and America.—Shipments to Europe from the East for the period 1st January to 20th December, 1934, totalled 1,172,063 tons, as compared with 1,233,493 tons in 1933, a decrease of 5.0 per cent.

Of the 1934 shipments 33 per cent. were from Burma, 4 per cent. from Japan, 51 per cent. from Saigon, 10 per cent. from Siam and 2 per cent. from Bengal. The 1933 percentages were 46, 2, 44, 7 and 1 respectively.

Shipments from the East to the Levant for the period 1st January to 17th November 1934 totalled 28,274 tons, an increase of 17.8 per cent. as compared with 23,993 tons in 1933.

Shipments to the West Indies and America from 1st January to 21st November 1934 amounted to 181,691 tons, an increase of 15.3 per cent. as compared with 157,543 tons in 1933.

THE NETHERLANDS INDIES RUBBER STATISTICS.

The following information has been received from the Chief of the Central Bureau of Statistics, Batavia.

Production on Estates converted to long tons of 2,240 lbs. dry weight

Territory.	Total 1933	December 1934	January to May inclusive 1934	June to December inclusive 1934	Total January to December inclusive 1934 (4) + (5)
(1)	(2)	(3)	(4)	(5)	(6)
Java ...	71,827	6,431	35,734	41,695	77,429
Outer Provinces ...	94,457	9,441	42,598	62,097	104,695
Total Netherlands Indies ...	166,284	15,872	78,332	103,792	182,124

Notes:—This is an estimate of total production of all estates (*i.e.* excluding native production), based upon monthly records of nearly 96 per cent. of all estates.

THE NETHERLANDS INDIES RUBBER STATISTICS.

The following information has been received from the Chief of the Central Bureau of Statistics, Batavia.

Acreages of tappable rubber not tapped on Rubber Estates, for the month ending 31st December, 1934.

Area	Acreage of Tappable Rubber end December, 1934	Acreages of tappable rubber not tapped				Area of Tappable Rubber never been tapped		Total (3) + (5)	Percentage of (9) to (2)
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping					
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(5)	(4)	(3)	(6)	(7)	(8)	(9)	(10)
Java and Madura ...	480,193	23,062	4.8	36,512	7.6	32,740	6.8	59,574	12.4
Outer Provinces ...	744,478	37,038	5.0	116,233	15.6	98,795	13.3	153,271	20.6
Total Netherlands Indies ...	1,224,671	60,100	4.9	152,745	12.5	131,535	10.7	212,845	17.4

Notes:—1. The above acreages are converted from hectares at 2.47 acres.

2. The figures for the acreages of tappable rubber have been revised.

MALAYAN AGRICULTURAL EXPORTS, DECEMBER, 1934.

PRODUCT.	Net Export in Tons.			
	December 1933.	December 1934.	Year 1933	Year 1934.
Arecanuts ...	670	1,560	20,756	18 882
Coconuts, fresh † ...	6,507†	11,039†	100,609†	100,826†
Coconut oil ...	1,419	2,347	17,568	25,485
Copra ...	13,577	8,925	110,543	95,618
Gambier, all kinds ...	266	144	2,560	2,170
Oil cakes ...	903	676	9,992	11,273
Palm kernels ...	170	425	1,983	3,196
Palm oil ...	1,635	797	12,101	15,852
Pineapples canned ...	5,242	4,840	59,582	66,633
Rubber ¶ ...	45,205¶	52,500¶	459,836¶	479,371¶
Sago,—flour ...	1,614	1,944	7,648	10,503
„ —pearl ...	369	1,683	2,646	6,177
„ —raw ...	503*	753*	4,420*	7,079*
Tapioca,—flake ...	696	169	9,881	5,761
„ —flour ...	332*	56*	702*	1,842*
„ —pearl ...	1,050	1,425	17,297	15,770
Tuba root ...	71½	20	569½	481

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION IN TONS OF PALM OIL AND KERNELS
4th. Quarter, 1934.

(As declared by Estates)

	Palm Oil		Palm Kernels	
	F.M.S.	Johore	F.M.S.	Johore
October ...	1302.3	368.4	195.9	54.9
November ...	1266.9	450.3	178.4	75.1
December ...	1125.2	404.5	152.0	58.1
Total ...	3694.4	1223.2	526.3	188.1
Total for year ...	12,963	4,510	2,013	795

MALAYA RUBBER STATISTICS

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST DECEMBER, 1934.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1933 (*d*)	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING (*a*)		AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total (3) + (5)	Percentage of (9) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
STRAITS SETTLEMENTS :—									
Province Wellesley	44,285	1,120	2.5	7,333	16.6	567	1.3	8,462	19.1
Dindings	7,368	360	4.9	790	10.7	114	1.5	1,150	15.6
Malacca	121,152	135	0.1	13,454	11.1	2,348	1.9	13,589	11.2
Penang Island	1,364	126	9.2	299	21.9	114	8.3	425	31.1
Singapore Island	28,843	2,079	7.2	5,373	18.6	615	2.1	7,452	25.8
Total S.S. ...	203,013	3,829	1.9	27,249	13.4	3,758	1.9	31,078	15.3
FEDERATED MALAY STATES :—									
Perak	253,227	2,240	0.9	32,058	12.6	14,781	5.8	34,367	13.5
Selangor	310,003	3,772	1.2	35,118	11.3	11,241	3.6	38,890	12.5
Negri Sembilan	233,502	1,780	2.0	27,855	11.9	15,012	6.4	32,635	13.9
Pahang	46,712	3,772	8.0	15,360	32.9	10,369	22.2	19,138	40.9
Total F.M.S. ...	843,534	14,573	1.7	110,397	13.1	51,403	6.1	124,970	14.8
UNFEDERATED MALAY STATES :—									
Johore	365,400	8,237	2.2	22,123	6.1	19,390	5.0	30,360	8.3
Kedah (*b*)	126,588	1,798	1.4	28,886	22.8	19,593	15.5	30,684	24.2
Kelantan	25,793	5,176	20.1	2,256	8.7	5,084	19.7	7,432	28.8
Trengganu (*b*)	4,543	Nil	Nil	98	2.2	98	2.2	98	2.2
Perlis (*c*)	1,181	Nil	Nil	543	46.0	Nil	Nil	543	46.0
Total U.M.S. ...	523,505	15,211	2.9	53,906	10.3	44,082	8.4	69,117	13.2
TOTAL MALAYA ...	1,570,052	33,613	2.1	191,552	12.2	99,243	6.3	225,165	14.3

Notes :—(*a*) Area out of tapping on Estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.
(*b*) Registered Companies only.
(*c*) Rendered quarterly.
(*d*) Figures are as reported by estate managers.

MALAYA RUBBER STATISTICS

TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF DECEMBER, 1934, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month		
								during the month		January to Dec. inclusive 1934		during the month		January to Dec. inclusive 1934				
	Ports	Dealer	Estates of 100 acres and over	during the month	January to Dec. inclusive 1934	during the month	January to Dec. inclusive 1934	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
MALAY STATES :—																		
Federated Malay States ...	...	11,786	10,393	15,576	147,417	11,414	104,141	Nil	Nil	Nil	Nil	18,008	15,894	182,835	87,032	...	8,202	7,057
Johore ...	..	2,985	3,169	4,899	46,694	6,624	54,562	Nil	42	Nil	494	1,871	11,624	20,214	83,808	...	1,991	2,224
Kedah ...	..	462	2,228	3,776	33,962	1,539	17,228	Nil	Nil	Nil	Nil	2,179	4,058	18,474	33,780	...	262	1,506
Perlis ...	...	26	19	9	157	36	355	Nil	Nil	Nil	Nil	Nil	51	Nil	516	...	12	27
Kelantan ...	...	249	176	398	3,188	681	7,982	Nil	Nil	319	Nil	147	1,023	1,240	10,333	...	161	173
Trengganu ...	...	55	50	246	2,670	122	1,332	Nil	Nil	Nil	Nil	Nil	368	Nil	4,002		55	50
Total Malay States	...	15,563	16,035	24,895	234,088	20,416	185,600	Nil	42	319	494	22,205	33,018	222,763	219,471	...	10,683	11,037
STRAITS SETTLEMENTS :-																		
Malacca ...	...	3,058	1,056	1,792	17,418	3,025		Nil		4		4,373		40,978		...	3,450	806
Province Wellesley ...	...	1,891	561	693	7,012	251		Nil		Nil						...	2,216	434
Dindings ...	..	43	153	122	1,310	198	31,403	Nil	23,400	Nil	198,573	9,844	Nil	97,477	Nil	...	18	52
Penang ...	4,152	10,634	12	23	163	401		2,163		27,080						3,697	11,861	9
Singapore ...	4,483	38,648	210	275	2,377	409		13,212		184,040		23,600		315,930		7,190	39,394	162
Total Straits Settlements	8,642	54,274	1,972	2,905	28,280	4,284	31,403	15,375	23,400	211,124	198,573	37,817	Nil	454,385	Nil	10,887	56,939	1,463
TOTAL MALAYA	8,642	69,837	18,007	27,800	262,368	24,700	217,003	15,375	23,442	211,443	199,067	59,422	33,018	677,268	219,471	10,887	67,622	12,500

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
20	21	22	23	24	25	26
DRY RUBBER	6,931	35,574	10,430	5,391	1,413	165
WET RUBBER	1,271	3,820	1,431	293	578	97
TOTAL	8,202	39,394	11,861	5,684	1,991	262

TABLE III
FOREIGN EXPORTS

PORTS	For month	January to Dec. 1934
27	28	29
Singapore ...	36,063	448,452
Penang ...	16,038	153,014
Port Swettenham.	6,868	66,167
Malacca ...	453	6,575
MALAYA ...	59,422	677,208

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	January to Dec. 1934
30	31	32
Malay States ...	55,379	405,765
Straits Settlements	7,012	
MALAYA ...	62,391	405,765

Notes :—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [9] = Columns [15] + [16] + [19] + [20] + [21] + [22] − [4] − [5] − [6] − [7] − [11] − [12]. For the Straits Settlements, Column [9]: figures for Singapore and Penang Islands represent sales or exports as shown by cess paid and for the mainland represent as previously purchases by dealers from local estates of less than 100 acres.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Column (31) represents domestic exports, being net exports from the mainland Labuan and Brunei, plus production as represented by sales or exports in the Islands of Singpore and Penang. Column (32) represents net exports in the absence of any means of calculating domestic exports of the Straits Settlements for the period January to May inclusive. Column (32) includes from June inclusive 243,972 tons rubber debitable to quota under the Rubber Regulation Agreement dated 7th May, 1934. (Figures may be subject to minor adjustment.)
5. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 24 January, 1934.

METEOROLOGICAL SUMMARY, MALAYA, DECEMBER, 1934.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B.	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						Hrs.	Hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	89.4	71.0	80.2	93	67	82	74	83.0	83.9	3.63	92.2	1.55	14	10	1	4		179.90	5.80	49
Bukit Jeram, Selangor ...	87.3	71.4	79.3	91	68	81	74	83.9	84.2	6.41	162.8	1.71	13	10		1		230.05	7.42	62
Sitiawan, Perak ...	88.5	71.7	80.1	91	67	85	75	83.2	84.3	5.91	150.1	1.91	13	6				211.85	6.83	57
Temerloh, Pahang ...	86.8	70.5	78.7	92	65	79	74	83.1	84.7	10.26	260.6	2.93	13	11		11		218.10	7.03	59
Kuala Lipis, Pahang ...	85.7	69.6	77.7	90	66	78	73	81.7	83.1	7.33	186.2	3.10	13	8		19		200.90	6.48	54
Kuala Pahang, Pahang ...	83.0	73.5	78.3	86	69	79	77	82.6	83.6	4.17	105.9	0.94	19	13		1		234.35	7.56	64
Kallang Aerodrome, S'pore ...	86.0	73.8	79.9	89	71	80	76	79.9	81.4	3.28	83.3	1.23	14	11				187.70	6.05	50
Butterworth, Province Wellesley ...	87.0	71.5	79.2	89	68	81	75	82.9	84.0	2.46	62.5	0.80	7	6				282.60	9.12	77
Bukit China, Malacca ...	85.5	72.8	79.1	89	70	78	75	81.7	82.3	3.53	89.7	1.71	9	7				223.00	7.19	60
Kluang, Johore ...	87.5	70.4	78.9	94	66	79	73	80.3	81.5	2.60	66.1	0.80	10	8		3		204.25	6.59	55
Bukit Lalang, Mersing, Johore	82.4	72.4	77.4	86	68	77	77	79.0	79.8	9.77	248.2	2.71	13	10		1		212.50	6.85	57
Alor Star, Kedah ...	87.7	68.8	78.3	91	63	82	73	82.0	84.2	1.67	42.4	1.38	6	4	3	2		271.95	8.77	74
Kota Bahru, Kelantan ...	83.5	70.2	76.9	90	66	78	74	79.6	82.4	9.41	239.0	3.59	18	13		1		220.40	7.11	60
Kuala Trengganu, Trengganu	82.9	70.7	76.8	87	67	77	74	79.2	81.3	7.52	191.0	4.45	20	11		1		210.10	6.78	57
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft. Pahang ...	69.7	59.7	64.7	75	53	62	63	70.0	71.0	6.23	158.3	1.01	19	15		15		128.50	4.15	35
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	70.5	54.8	62.7	74	47	66	61	68.2	68.9	5.73	145.5	3.57	13	12				138.75	4.48	38
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	69.5	57.1	63.3	73	52	64	61			6.17	156.7	3.73	14	11				154.60	4.99	42

Compiled from Returns supplied by the Meteorological Branch, Malaya.

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